

Cross Reactions Among Foods

By Scott Sicherer, M.D.

Does a person with an allergy to peanut, a legume, need to avoid all beans? Allergy to a particular food may raise concerns about allergy to “related” foods. The concern arises because specific proteins may have similarities among related foods (and in some cases, seemingly unrelated foods). There are surprisingly few studies on this topic, but there are a number of helpful observations:

- The risk varies according to the food. For example, persons with a wheat allergy are not very likely to be allergic to multiple grains (one in five risk). However, those with a fish allergy are likely to be allergic to more than one type of fish (approximately 50% risk).
- Allergy tests are often positive to related foods even though many or all of the foods would be tolerated. This is because many foods have similar proteins that the immune system may recognize, but the recognized proteins, or the nature of the immune response, are not sufficient to cause a reaction. For instance, more than 50% of children with a peanut allergy test positive to other beans (pea, soy, string bean, etc.) but only about one in 20 experience symptoms from these beans. Therefore, “screening” tests are often misleading.
- Botanical “families” may not be a relevant concern. For example, the nightshade family includes potato, tomato, eggplant, and sweet pepper; however, allergy to any of these foods, already a rarity, is not likely to indicate a significant risk of allergy to the remainder.
- Some allergy relationships are driven by pollen allergy. For instance, some persons with allergy to birch pollen have symptoms, usually mild, to raw fruits/vegetables that have similar proteins to the pollen. These foods might include apple, peach, and other pitted fruits but also carrot and hazelnut. As mentioned above, there is tremendous variability because most people with birch allergy have no symptoms from foods, and among those who do, they may have problems with any or several from among the potentially cross-reactive foods.
- Some foods appear to be unrelated, but may share similar proteins that, in some cases, may be problematic. For example, approximately 10% of children with a significant cow’s milk allergy may react to beef (particularly undercooked forms) because some of the cow’s proteins are in both the milk and the beef.
- There is tremendous variation among individuals. Examples of this would include persons with allergy to specific types of shrimp who appear to tolerate other types of shrimp and all other shellfish, or persons with allergy to one specific type of finned fish (e.g., swordfish) but tolerate all other types, and persons with allergy to one type of mammalian milk (e.g., goat’s) who tolerate other types (e.g., cow’s).

- There are specific relationships that may transcend categorizing foods simply by “family.” Among tree nuts, some nuts have greater similarities than others: pistachio is very similar to cashew, walnut to pecan, and almond to hazel. Although sesame, poppy, and sunflower are all seeds that could cause reactions, sesame appears to be more common a trigger of reactions than the other seeds.

The accompanying table summarizes the approximate rate of relevant cross-reactivity among common allergens. The table should only be considered a rough guide for the reasons stated above. Having an allergy to one type of food may warrant a discussion with your allergist about the related foods. However, there are many aspects that must be individualized in deciding how to proceed.

In general, if an individual is already eating and tolerating a food, there would not likely be a concern about that food. To illustrate, if a child who is newly diagnosed with peanut allergy, but already tolerating various beans, there is no strong reason to perform allergy tests or to avoid all beans. Although there may be concern about beans that were not yet included in the diet (e.g., navy beans, lima beans), these would also be unlikely triggers. An exception might be lupine, an uncommon bean that has been reported, primarily from Europe, to be higher risk in persons with peanut allergy (perhaps over 25% risk).

The type of food and severity of reaction may play a part in decision-making with regard to avoidance. For example, a severe cashew allergy may warrant, for some families, avoidance of all tree nuts to reduce confusion and risk of cross-contact among nuts. However, allergy to a particular nut does not necessarily result in allergy to all nuts and some families may wish to work with their doctor to individualize identification of tolerated nuts for routine consumption. The same may be said for fish and shellfish. A child’s age and family dietary preferences play a role in these decisions.

When addressing cross-reactivity among foods, it is important to consider limitations of any food allergy evaluation. Specifically, it is possible to have a positive test and still be able to tolerate the food. This caveat about testing is particularly important to consider when addressing cross-reactivity among related foods because the chances of finding positive tests is higher, as mentioned above for beans. Therefore, screening tests may be misleading and testing for foods already tolerated would be irrelevant. Medically supervised feeding tests might be needed.

The risk of allergy may have more to do with intrinsic allergenic properties of a food more than relationships among foods. For example, a young child with egg allergy has an increased risk of peanut allergy, not because peanut protein is similar to egg, but because these are both foods with a higher allergenic potential.

Talk to your allergist about any concerns related to cross-reactivity among foods. Depending upon your individual circumstances, it may be possible to expand the diet or, conversely, it may be reasonable to continue avoidance of higher-risk related foods.

Approximate Rates of Allergy Among Related Foods

Food	Related Foods	Percent risk (approximate) of allergy to related foods	Notes
Peanut	Beans, such as soy, pea, string bean, navy, lima, etc.	5%	May be higher for lupine
Nuts, such as walnut	Pecan, cashew, pistachio, almond, hazel, Brazil, macadamia, etc.	35%	Varies according to the type of nut
Fish, such as cod	Salmon, tuna, etc.	50%	
Shellfish, such as shrimp	Lobster, crab, etc.	75%	May be lower for non-crustacean shellfish (clams, etc.)
Wheat	Barley, rye, etc.	20%	
Cow's milk	Sheep's milk, goat's milk	90%	Mare/donkey milk less cross-reactive (~5%)

Scott H. Sicherer, M.D., is associate professor of pediatrics, Jaffe Food Allergy Institute, Mount Sinai School of Medicine, New York. He is also a member of FAAN's Medical Advisory Board.